University of Nebraska - Lincoln
DigitalCommons@University of Nebraska - Lincoln

Bird Control Seminars Proceedings

Wildlife Damage Management, Internet Center for

10-1983

AN EVALUATION OF AVITROL ON PARAKEETS IN PAKISTAN

Abdul Aziz Khan
Vertebrate Pest Control Laboratory

Shakeel Ahmad
Vertebrate Pest Control Laboratory

AN EVALUATION OF AVITROL ON PARAKEETS IN PAKISTAN

Abdul Aziz Khan and Shakeel Ahmad
Vertebrate Pest Control Laboratory
University Campus
Karachi, Pakistan

ABSTRACT

Tableted corn bait of 4-Aminopyridine was laboratory evaluated against *Psittacula krameri* at three concentrations (2%, 2.5% and 3.0%) and three different dose levels within each concentration (23.85, 71.87 and 122.44 mg/bird). The data analysis showed significant difference ($P < 0.05$) among the three concentrations in respect of the duration of vocal distress calls. The change in concentration and dose had non-significant effects ($P > 0.05$) on the time from dosing to first call. Similarly, change in dose also had a non-significant effect ($P > 0.05$) on the duration of vocal calls. Numbers of calls were significantly affected with the increase in concentration of 4-AP, but within three dose levels this effect was in the reverse order. Field trials are required to test the efficacy of 4-AP at these three bait concentrations against this psittid.

INTRODUCTION

The rose-ringed parakeet, *Psittacula krameri* (Scopoli), extensively inhabits almost all of Pakistan, India, Bangladesh, Nepal, Central Burma, and Srilanka (Ali, 1977). In recent years it has become extraordinarily abundant in the canal-irrigated and rainfed areas of Pakistan where it does serious damage to crops such as cereals, oil seeds, and fruits (Bindra and Toor, 1972; Ramzan and Toor, 1971 & 1972; De Grazio and Besser, 1975; Besser, 1976; Qureshi, 1980; Bashir et al., 1981; Sandhu and Dhindsa, 1982). A recent study conducted by the authors in Pakistan indicated 14-15% average damage to the sunflower crop in Sind and Punjab. Similar situations exist in other countries (Besser, 1978). During the last few years the Ghee Corporation of Pakistan has adopted a policy to encourage sunflower cultivation in order to reduce vegetable oil imports and increase the indigenous production. The rose-ringed parakeet's depredation on this crop has become a limiting factor in achieving the desired production targets. The spring crop is most affected as other crops, such as wheat and millet, have already been harvested, making the sunflower crop more attractive to parakeets. Losses are serious in rainfed areas and on small farms.

Due to the seriousness of this economically important bird pest problem, Bashir et al. (1981) undertook some laboratory and field trials using 4-Aminopyridine (4-AP) in order to reduce parakeet damage to sunflower heads. The laboratory trials, though inconclusive, provided some basic information on the use of 4-AP as a frightening agent. The field experiments indicated 55% reduction in the number of damaged heads after treatment.

The compound 4-AP has been used extensively with varying degrees of success in U.S.A. against blackbirds damaging ripening maize, sunflowers, peanuts, and fruits (De Grazio et al., 1971 & 1972; Besser, 1976; and Stickley et al., 1976). No detailed information is available on the laboratory screening of 4-AP against rose-ringed parakeets. However, some preliminary data on the frightening aspects are available with 4-AP-treated red-winged blackbirds (Garrison et al., 1979). Studies on the acute toxicity of 4-AP to birds and mammals were carried out by Schafer et al. (1973), but parakeets were not screened against this compound.

The present studies on the laboratory testing of 4-AP against *P. krameri* were conducted to get an accurate evaluation of the minimum dosage and concentration level at which birds will give the maximum number of extended distress calls, a prerequisite for its successful use against the target bird species.

METHODS AND MATERIALS

A modified "Parotrap" used for trapping the rose-ringed parakeets was placed on the premises of the Vertebrate Pest Control Laboratory (Bashir, 1979). Birds of both sexes were used for testing. Unhealthy and subadult birds were not used to avoid variables. The birds were weighed and put in separate cages before treatment but were not starved.

Tableted corn bait of 4-AP was formulated (as described by Garrison et al, (1979) at three levels (2.0, 2.5 and 3.0%). Each tablet of 3 mm was 23.85 ± 0.52 mg in weight. The tablets were orally administered. For each specific dose (1, 3, and 5 tablets) within different concentrations five birds were used (Table 1). Thus, for one concentration level, 15 birds were tested.

The behavioral changes of each treated bird were closely observed and recorded. A stop watch was used to record periods of distress. The birds remaining alive after giving distress calls were kept under observation for 24 hours and then released in the open air to check movements and flight.

The data were recorded on the following observations for each treated bird:

1. Amount of chemical received in mg/kg of body weight.
2. Time from dosing to first call.
3. Duration of vocal distress cries and intervals between them.
4. Duration of vocal distress calls.
5. Number of calls.
6. Mortality.

The data were analysed with ANOVA.

RESULTS AND DISCUSSION

The efficacy results of three 4-AP bait concentrations are summarized in Table 1. Results obtained from the forced feeding of 4-AP tablets to rose-ringed parakeets indicated that the different concentrations and the doses had non-significant ($P > .05$) effects on the time from dosing to first call. Similarily, the doses within each concentration also had non-significant effects ($P > .05$) on the duration of vocal distress calls. However, the three different concentrations had a significant effects ($P < .05$) on each behavioral parameter.

The data on duration of vocal distress calls showed that change in concentrations and doses did not produce any significant effects ($P > .05$). Numbers of calls produced by each affected bird were counted: the three concentrations produced a significant effect ($P < .05$), but the doses within each concentration had non-significant values ($P > .05$).

As is evident from the data presented in the table, with the increase in concentration (mg/kg) the numbers of vocal distress calls were reduced. The maximum number of calls was produced at the 2% concentration level. Birds receiving lesser amounts (mg/kg) of 4-AP had longer durations of distress calls; some individuals cried for more than two hours. On the other hand, the majority of birds getting larger amounts of the compound had shorter duration calls, 0-30 minutes.

The increase in mortality was related to the increase in concentration and dose. The flight and movements were severely affected only in those individuals remaining alive after going into convulsions and emitting distress calls.

The LD_{50} value determined was 3.33 mg/kg (2.38-4.66 mg/kg with 95% confidence limits). This was calculated by the moving point interpolation method described by Thompson and Weil (1952). In a recent study conducted in Bangladesh, the LD_{50} value of 4-AP determined against rose-ringed parakeets was 3.1 mg/kg (Bruggers, 1982), a value very close to the one calculated in the present study.

It can be concluded from the results of these studies that the bait concentration significantly affected the number and duration of vocal distress calls. The change in dose had a non-significant effect on the parameters studied. Therefore, bait prepared at 2.0, 2.5, and 3.0% of 4-AP can give desired distress behavior in parakeets when applied under field conditions. However, there will be less chance of poisoning nontarget bird species with 2.0 and 2.5% than with 3.0% bait.

ACKNOWLEDGEMENTS

We highly appreciate the help of Melvyn Garrison for the preparation of tableted corn bait of 4-AP for this study.

LITERATURE CITED

Ali, S. 1977. The book of Indian birds. 10th Edition. Bombay Nat. Hist. Soc. 162 pp.

Bashir, E. A. 1979. A new "PAROTRAP" adopted from the MAC trap for capturing live parakeets in the field. pp. 167-171 *In* W.B. Jackson (ed.), Proc. 8th Bird Control Seminar, Bowling Green State University, Bowling Green, Ohio.

Bashir, E. A., A. S. Siddiqui, and I. Mian. 1981. Investigations of some aspects related to the rose-ringed parakeet damage control in sunflower in Pakistan. FAO-AGRO-PAK/71/554. 10 pp.

Besser, J. F. 1976. 4-Aminopyridine for protecting crops from birds- a current review. Proc. Vert. Pest. Conf. 7:11-16.

__________. 1978. Birds and sunflower. pp. 263-278 *In* J. F. Carter (ed.), Sunflower Science and Technology, American Society of Agronomy, Madison, Wisconsin.

Bindra, O. S. and H. S. Toor. 1972. Harmful birds and their control. Punjab Agriculture University, Ludhiana (India). 14 pp.

Bruggers, R. L. 1982. Vertebrate damage control research in agriculture. Annual Report, 1982. Denver Wildlife Research Centre, Denver. 99 pp.

De Grazio, J. W., J. F. Besser, T. J. DeCino, J. L. Guarino, and R. I. Starr. 1971. Use of 4-Aminopyridine to protect ripening corn from blackbirds. J. Wildl. Manage. 15: 565-569.

De Grazio, J. W., J. F. Besser, T. J. DeCino, J. L. Guarino, and E. W. Schafer. 1972. Protecting ripening corn from blackbirds by broadcasting 4-Aminopyridine baits. J. Wildl. Manage. 36:1316-1320.

De Grazio, J. W. and J. F. Besser. 1975. A trip survey report to Uruguay. DWRC Publication, Denver. U.S.A.

Garrison, M. V., D. F. Mott, M.R. Quellette, and G. Holquin. 1979. A tableted corn bait to deliver uniform dosage of 4-Aminopyridine to red-winged blackbirds. J. Wildl. Manage. 43(3):743-747.

Qureshi, J. I. 1980. Granivorous bird pests of Pakistan and their control. Pakistan J. Sci. 32(1-2):91-94.

Ramzan, M. and H.S. Toor 1971. Damage to maize crop by rose-ringed parakeet, *Psittacula krameri* (Scopoli) in the Punjab. J. Bombay Nat. Hist. Soc. 70(1):201-203.

__________ 1972. Studies on damage to guava fruit due to rose-ringed parakeet, *Psittacula krameri* (Scopoli) at Ludhiana. The Punjab Hort. J. 12(2 & 3):144-145.

Sandhu, P. S. and M. S. Dhindsa. 1982. Damage by rose-ringed parakeet and other animal pests at Ludhiana, Punjab. Indian Jour. Agric. Sci. 52(11):779-781.

Schafer, E. W., Jr., R. B. Brunton and D. J. Cunningham. 1973. Summary of the acute toxicity of 4-Aminopyridine to birds and mammals. Toxicol. & Appl. Pharmacol. 26: 532-538.

Stickley, A.R., R.T. Mitchell Jr., J.L. Seuber, C.R. Ingram and M.I. Dyer. 1976. Large scale evaluation of blackbird frightening agent 4-Aminopyridine in corn. J. Wildl. Manage. 40: 126-131.

Thompson, W. R. and C. S. Weil. 1952. On the construction of tables for moving average interpolation. Biometrics. 8: 51-54.

TABLE 1. Responses of caged parakeets to dosing with 4-Aminopyridine treated tablets.

4-AP Conc. and tablet wt. (mg) $\overline{X} \pm SE$	Birds (No.)	Average body wt. (gm)	Amount of 4-AP received (mg/kg) $\overline{X} \pm SE$	Time from dosing to first call (Minutes) Min.	Max.	$\overline{X} \pm SE$	No. birds emitting vocal distress calls. 0-30 min.	31-60 min.	61-120 min.	121- min.	Distress calls (Average) No.	Length (Sec.)	Range (Sec.)	Mortality (N)	No. Birds did not produce distress calls.
2%															
23.85 ± 0.52	5	110.7	4.31 ± 0.08	24	103	58 ± 17.46	1	1	2	—	61	12	1-105	2	1
71.87 ± 1.10	5	116.1	12.37 ± 0.08	44	134	82 ± 22.45	1	1	1	1	65	12	1-98	3	1
122.44 ± 1.77	5	126.4	19.42 ± 0.57	61	122	92 ± 11.98	—	2	2	1	48	8	1-106	5	—
2.5%															
23.85 ± 0.52	5	114.78	5.20 ± 0.12	53	110	89.33 ± 18.22	1	2	—	—	30	5	1-29	1	2
71.87 ± 1.10	5	120.44	14.91 ± 0.07	45	91	62.75 ± 10.75	2	1	1	—	18	22	1-223	4	1
122.44 ± 1.77	5	120.3	25.46 ± 0.36	35	180	71.4 ± 27.47	3	2	—	—	26	21	1-236	5	—
3.0%															
23.85 ± 0.52	5	98.42	7.41 ± 0.53	25	51	35.5 ± 5.5	2	—	1	1	40	9	1-31	3	1
71.87 ± 1.10	5	105.38	20.47 ± 0.27	35	72	47.8 ± 6.66	3	2	—	—	19	11	1-79	5	—
122.44 ± 1.77	5	120.8	30.41 ± 0.35	45	79	59.6 ± 7.06	3	1	1	—	34	13	1-185	5	—